UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/550,054	07/05/2006	Satish Reddy	100325.0202US	6184

24392 7590 02/03/2010

FISH & ASSOCIATES, PC
ROBERT D. FISH
2603 Main Street
Suite 1000
Irvine, CA 92614-6232

EXAMINER	
PETTITT, JOHN F	

ART UNIT	PAPER NUMBER
3744	

NOTIFICATION DATE	DELIVERY MODE
02/03/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

rfish@fishiplaw.com
patents@fishiplaw.com

Office Action Summary	Application No.	Applicant(s)	
	10/550,054	REDDY ET AL.	
	Examiner	Art Unit	
	John F. Pettitt	3744	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 January 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9 and 11-21* is/are pending in the application.

4a) Of the above claim(s) *1-8 and 13-21* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *9,11 and 12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

2. **Claims 9 and 11-12** are rejected under 35 U.S.C. 103(a) as obvious over Alder et al. (US 4,270,937) hereafter Alder in view of Wilson (5,370,851) hereafter Wilson.

In regard to claim 9, Alder teaches a plant (see all figures) comprising: a gasification and shift unit (column 10, lines 9-10) coupled to a dryer (20) to provide a shifted syngas (10; column 10, line 9) as the feed gas (10) to the dryer (20); the dryer (20) comprising a desiccant (column 11, lines 40-43 hereafter scavenger) and configured to receive a feed gas (10) comprising hydrogen sulfide and carbon dioxide (column 10, lines 25-35); wherein dryer (20) configured to receive a feed gas (26) and to produce a desiccated gas that predominantly comprises hydrogen, carbon dioxide,

carbonyl sulfide, and carbon monoxide (column 10, lines 25-35); a source of liquid carbon dioxide (55, 60) fluidly coupled to an absorber (30 and/or 35) and configured to provide liquid carbon dioxide to the absorber (30 and/or 35); wherein the absorber (30, and/or 35) is further fluidly coupled to the dryer (20) and configured to receive the carbonyl sulfide and carbon dioxide (in 25) such that the liquid carbon dioxide in the absorber (30 and/or 35) absorbs at least part of the carbonyl sulfide to so form a carbonyl sulfide-containing liquid carbon dioxide bottom product (39); and a distillation column (55) fluidly coupled to the absorber (30 and/or 35) to receive the carbonyl sulfide-containing liquid carbon dioxide bottom product (39) and configured to separate the carbonyl sulfide (57) from the carbon dioxide (56).

Alder does not explicitly teach that the dryer comprises a desiccant coated with a carbonyl sulfide hydrolysis catalyst. However, Wilson teaches that his molecular sieve invention comprises a desiccant (column 4, line 32, 46, 64) coated with a carbonyl sulfide hydrolysis catalyst (column 4, line 60-65) and that such may be used for natural gas drying (column 7, lines 35-40; column 8, line 22). Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to modify the plant of Alder with the molecular sieve taught by Wilson for the purpose of providing improved dehydration.

In regard to claim 11, Alder teaches that the source (55, 60) of liquid carbon dioxide (LCO2) comprises an autorefrigeration unit (40, 33, 73, 77, 79, and/or 75).

In regard to claim 12, Alder teaches that the autorefrigeration unit (40, 33, 73, 77, 79, and/or 75) further produces a hydrogen containing gas (100).

3. **Claims 9 and 11-12** are rejected under 35 U.S.C. 103(a) as obvious over Hise et al. (US 5,021,232) hereafter Hise in view of Alder and further in view of Wilson

In regard to claim 9, Hise teaches a plant (see all figures) comprising: a dryer (12) configured to receive a feed gas (26) and to produce a desiccated gas that predominantly comprises hydrogen, carbon dioxide, carbonyl sulfide, and carbon monoxide (column 1, lines 55-60; column 3, lines 10-15; column 4, lines 40-48); a source of liquid carbon dioxide (16) fluidly coupled to an absorber (14) and configured to provide liquid carbon dioxide (36) to the absorber (14); wherein the absorber (14) is further fluidly coupled to the dryer (12) and configured to receive the carbonyl sulfide and carbon dioxide (in 26) such that the liquid carbon dioxide in the absorber (14) absorbs at least part of the carbonyl sulfide to so form a carbonyl sulfide-containing liquid carbon dioxide bottom product (40); and a distillation column (80, 90; column 2, line 43; column 10, line 55-60) fluidly coupled to the absorber (14) to receive the carbonyl sulfide-containing liquid carbon dioxide bottom product (40) and configured to separate the carbonyl sulfide (in 18'b) from the carbon dioxide (in 34'b).

Hise does not explicitly teach that the feed gas to the dryer is preceded by a gasification and shift unit to provide a shifted syngas as the feed gas to the dryer (12). However, Hise teaches that the feed gas is a tail gas that requires cleaning (column 4, lines 40-45). Additionally, sending a shifted syngas as the feed gas to the dryer (20) from a gasification and shift unit is a well known method of providing syngas, as is taught by Alder (column 10, lines 9-10). Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to employ the method of

treating natural gas taught by Hise on a shifted syngas. Further, Alder teaches that a dryer may be a desiccant but does not explicitly teach that the dryer (12) comprises a desiccant that is coated with a carbonyl sulfide hydrolysis catalyst. However,

Hise does not explicitly teach that the dryer comprises a desiccant coated with a carbonyl sulfide hydrolysis catalyst. However, Wilson teaches that his molecular sieve invention comprises a desiccant (column 4, line 32, 46, 64) coated with a carbonyl sulfide hydrolysis catalyst (column 4, line 60-65) and that such may be used for natural gas drying (column 7, lines 35-40; column 8, line 22). Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to modify the plant of Hise with the molecular sieve taught by Wilson for the purpose of providing improved dehydration of the shifted syngas of Hise and Alder.

In regard to claim 11, Hise teaches that the source of liquid carbon dioxide (16) comprises an autorefrigeration unit (44a,b, and/or 46a,b).

In regard to claim 12, Hise teaches that the autorefrigeration unit (16) further produces a hydrogen containing gas (62, 68, and/or 18'b).

4. Claims 9 and 11-12 are rejected under 35 U.S.C. 103(a) as obvious over Alder et al. (US 4,270,937) hereafter Alder in view of Lewis et al. (US 6,419,895) hereafter of Lewis.

In regard to claim 9, Alder teaches a plant (see all figures) comprising: a gasification and shift unit (column 10, lines 9-10) coupled to a dryer (20) to provide a shifted syngas (10; column 10, line 9) as the feed gas (10) to the dryer (20); the dryer (20) comprising a desiccant (column 11, lines 40-43 hereafter scavenger) and

configured to receive a feed gas (10) comprising hydrogen sulfide and carbon dioxide (column 10, lines 25-35); wherein dryer (20) configured to receive a feed gas (26) and to produce a desiccated gas that predominantly comprises hydrogen, carbon dioxide, carbonyl sulfide, and carbon monoxide (column 10, lines 25-35); a source of liquid carbon dioxide (55, 60) fluidly coupled to an absorber (30 and/or 35) and configured to provide liquid carbon dioxide to the absorber (30 and/or 35); wherein the absorber (30, and/or 35) is further fluidly coupled to the dryer (20) and configured to receive the carbonyl sulfide and carbon dioxide (in 25) such that the liquid carbon dioxide in the absorber (30 and/or 35) absorbs at least part of the carbonyl sulfide to so form a carbonyl sulfide-containing liquid carbon dioxide bottom product (39); and a distillation column (55) fluidly coupled to the absorber (30 and/or 35) to receive the carbonyl sulfide-containing liquid carbon dioxide bottom product (39) and configured to separate the carbonyl sulfide (57) from the carbon dioxide (56).

Alder does not explicitly teach that the dryer comprises a desiccant coated with a carbonyl sulfide hydrolysis catalyst. However, Lewis teaches that his molecular sieve invention comprises a desiccant (column 4, line 10) coated with a carbonyl sulfide hydrolysis catalyst (column 4, line 20-21; column 3, lines 25-30) and that such may be used for natural gas drying (column 5, lines 36-43). Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to modify the plant of Alder with the molecular sieve taught by Lewis for the purpose of providing improved dehydration.

In regard to claim 11, Alder teaches that the source (55, 60) of liquid carbon dioxide (LCO2) comprises an autorefrigeration unit (40, 33, 73, 77, 79, and/or 75).

In regard to claim 12, Alder teaches that the autorefrigeration unit (40, 33, 73, 77, 79, and/or 75) further produces a hydrogen containing gas (100).

Response to Arguments

5. Applicant's arguments filed 11/04/2009 have been fully considered but they are not persuasive.

1. Applicant's arguments (page 6, ¶ 4) are an allegation that the distillation column of Hise is upstream of the absorber and therefore not capable of meeting the claim limitation, "a distillation column fluidly coupled to the absorber to receive the carbonyl sulfide containing liquid carbon dioxide bottom product". In response to the applicant's arguments, the examiner fully disagrees and directs the applicant to notice that the absorber (14) receives the carbonyl sulfide containing liquid carbon dioxide bottom product (40) via line (18a'). Therefore the allegation is unpersuasive.

2. Applicant's arguments (page 6, ¶ 5) are that the term "autorefrigeration" is a specific term in the art as evidenced by the fact that the inventor employs the term in other patents and that Hise does not use the language "autorefrigeration". In response to the applicant's arguments, the examiner disagrees that the use of the term by one individual is sufficient evidence that the term is ordinarily understood to have only one specific meaning to those of ordinary skill in the art. Further, the allegation fails to provide any reasons why the autorefrigeration unit (44a,b, and/or 46a,b) of Hise may not be considered an autorefrigeration unit. No explanation is provided as to what the

broadest reasonable interpretation of "autorefrigeration" must be. Further no evidence is provided that supports the allegation. While on the other hand, the broadest reasonable interpretation of the term is considered to include a unit producing refrigeration by thermodynamic changes (such as expansion) of a fluid. Thereby, all of the evidence of Hise suggests that the evaporative cooling system (44a,b, and/or 46a,b) of Hise may indeed be an autorefrigeration unit as refrigeration is created by the thermodynamic responses of the fluid. Lastly, a reading of the previous patents cited by the applicant shows that the interpretation of the rejection is supported as Reddy (Us 6,301,927) explicitly teaches that autorefrigeration may comprise compression or expansion of a fluid (column 5, lines 40-50); therefore, the allegation is unpersuasive.

3. Applicant's arguments (page 7, ¶ 4) are an allegation that the column of Alder is not a distillation column. In response to the applicant's arguments, the examiner disagrees and notes that the a stripping column is a distillation column and therefore, such an allegation is unpersuasive.

4. Applicant's arguments (page 7, ¶ 5) are an allegation that the autorefrigeration unit (40, 33, 73, 77, 79, and/or 75) of Alder is not an autorefrigeration unit. In response to the applicant's arguments, the examiner disagrees as contradictory gainsaying is not a persuasive argument. No reasons have been provided to support the allegation and further it has been shown above that the interpretation of the term by the rejection is proper.

5. Lastly it is noted that the applicant's amendments concerning the dryer are addressed in the rejection above.

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to John F. Pettitt whose telephone number is 571-272-0771. The examiner can normally be reached on M-F 8a-4p.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cheryl Tyler or Frantz Jules can be reached on 571-272-4834 or 571-272-6681. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/John F Pettitt /
Examiner, Art Unit 3744

/Cheryl J. Tyler/
Supervisory Patent Examiner, Art Unit 3744

JFP III
January 21, 2010